

FINAL REPORT ON IT ISSUES IN SUPPORT
OF THE PENSION REFORM EFFORT IN
UKRAINE

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EXECUTIVE SUMMARY

This report summarizes my work as the IT expert on Pension Fund Reform after three weeks of analysis on site in the Ukraine. During this time I met with staff of the Pension Fund IT department, IT contractors and toured Oblast and Rayon offices.

In general, I am optimistic about the Pension Fund of Ukraine's ability to develop the necessary mechanisms to handle the IT requirements that will be posed by the reform of the pension fund.

I base this assessment on the performance to date of the Pension Fund of Ukraine in implementing the "personification" process. Specifically, the pension fund has successfully done the following:

- Hired 2500 additional personnel for the personification process
- Purchased 10,000 new computers of which 6,000 are devoted to personification.
- Purchased servers and rented space for the Central Computer site
- Developed software required for personification.

I have identified several issues that could be potential "problem areas" when the Government of Ukraine undertakes reform of its pension system and a mandatory accumulation system.

- What will be the "Reporting Period requirements" and what will be the impact of this?

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- There are certain groups of contributors who currently are not part of the personified system. What will be the impact of including them in the scheme?
 - There are other social insurance funds: Unemployment, Work Place Accident and Welfare Funds etc. Will these be combined with the Pension Fund of Ukraine reporting process and how will that affect the system?
 - The Pension Fund of Ukraine relies heavily on both Atlas Computer Firm and PADCO for software development and computer consulting. Should this dependence be reduced?
 - The Pension Fund of Ukraine must establish an effective IT department capable of handling the many additional IT requirements faced by the Pension Fund of Ukraine in the next few years.
 - Currently there is an employer reporting process, the 4PF, which requires the collection of information on a quarterly basis. It appears that the "personification" operation is a completely separate operational unit. How will these two operations be integrated?
 - The data transfer process between Rayon - Oblast - Central needs to be developed in a uniform fashion and the Oblast must be considered an important link in this data communication.

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- How will the Pension Fund of Ukraine collect the large quantity of data over the next several years? What methods will be used to accomplish this task:
 - How will the Pension Fund of Ukraine archive the large quantity of data over the next several years. What methods will be used to accomplish this task:
 - When will the Central Computer site be set-up?
 - What is the status of Atlas software?
 - What backup procedures are in place and are they adequate?
 - The Pension Fund of Ukraine does not appear to have an organized plan for maintenance of its computer equipment.

I have identified the following tasks that will need to be accomplished over the next few years in order to accomplish any significant Pension Reform.

Recommendation/Observation	Level
Retain ownership of all source code and systems developed by Atlas and PADCO	Critical

Develop a pilot scanning project	Critical
Reorganize the IT department to reflect functional activities. Combine personification and 4PF staff	Important
Reduce dependence on contractors	Important
Take over maintenance and development of ARM-R	Important
Set-up and staff the Central Computer site	Important
Develop training program for the IT staff in both hardware and software	Important
Develop a plan for data transfer between Oblasts and the Central Computer site	Important
Implement a more reliable method of transferring data from Rayon's to Oblasts.	Important
Establish strict procedures for backing up server data at the Rayon and Oblasts.	Important
Combine 4PF Reporting form with Personification.	Desirable

Begin to design an archiving methodology	Desirable
Develop a plan for maintenance of all Pension Fund computers, networks and software nationwide	Desirable
Begin developing an Internet based reporting form	Optional

Any effort to implement Pension Reform in the Ukraine will involve the intensive use of information technology. It is impossible to collect and process the quantities of data in a national Pension Fund of Ukraine without extensive use of technology.

USAID should play a continuing role in the design and development of an effective IT program for the Pension Fund of Ukraine.

1. General Discussion

This report will discuss my findings and recommendations about the IT (Information technology) issues related to pension reform in Ukraine. I have spent 18 days in Kiev, plus some preliminary study prior to my arrival in Kiev. I feel that this has been enough time to get a general picture of the IT situation within the Pension Fund of Ukraine and to draw some conclusions about the current state of IT.

On my initial visit in July, I was able to identify the major issues, which may be obstacles to successful implementation of pension reform in the Ukraine. On my second and final visit in September, I was able to focus in depth on these issues.

This report will present my findings from my three weeks of observation and study of the current operations of the Pension Fund of Ukraine. In addition, I have analyzed the proposed plans for IT implementation in support of the proposed legislation. Finally, I will conclude this report with some recommendations on how the Pension Fund of Ukraine may focus its efforts in the IT arena.

2. Methodology

During my first visit to Ukraine, I worked closely with the PADCO staff and established a good working relationship with them. That positive relationship continued during my second visit and

I would like to reiterate my appreciation for the help and cooperation of Mr. Mikhail Muchnik and translator Mr. Slava Kutepov. I would also like to express my appreciation to Mr. Mitch Weiner and the entire PADCO staff for their assistance.

The following chart identifies the dates of the meetings and site visits during both of my visits

Date of Trip	People and Sites Visited:
Tuesday July 18	Mr. Bonislavskiy, Mr. Didovik, Ukrainian Pension Fund
Tuesday July 18	Rayon Zhovtnevy
Friday July 21	Ms. Horyuk - Ministry of Labor
Wednesday Sept 20	Mr. Didovek - Ukrainian Pension Fund Mr. Ahre, Koval & Bondarchuk -Atlas
Thursday Sept 21	Mr. Druhov - Chairman, Lviv Oblast Pension Office Mrs. Olga Voina - Chief of Personification Office, Lviv Oblast Pension Fund Office Mrs. Maksymovich - Chairman Nikolai Rayon Pension Fund Office Mr. Kostiv - Chief of Personification Office Nikolai Rayon Pension Fund Office

Friday Sept 22	Mrs. Panchyshyn - Chairman Frankievsky Rayon Pension Fund Office Mr. Durko - Chief of Personification Office Frankievsky Rayon Pension Fund Office
Tuesday Sept 26	Mr. Bonislavskiy, Mr. Didovik, Ukrainian Pension Fund
Thursday Sept 28	Ms. Olga Filotova, Mr. Bonislavsky, Dnieroproski Rayon

It should be stressed that my comments and recommendations are based on my personal observations and from information I have received. In some cases the information I have received may be in error or may have been misunderstood in translation. I have taken additional steps to verify the accuracy of my information as much as possible. I feel that all people with whom I have met replied honestly to my questions. Our discussions were frank and truthful. In some cases, people may have painted a rosier picture than reality and in other cases information was withheld. In no case, did I find any outright falsehoods.

Therefore, my report, in many ways is a reflection of the many sides of the IT situation in the Pension Fund of Ukraine. My recommendations should be viewed as a fresh perspective on these issues and not as gospel. I see it as a starting point for discussion among all parties interested in a successful IT implementation within the pension reform effort in Ukraine.

3. Issues Studied

The following are the lists of topics and concerns, which were identified during my preliminary visit in July. During my second visit, I was able to delve more deeply into these areas. I have grouped them into major subject areas for clearer presentation.

A. Policy Issues - Issues relating to the overall pension policy, which will have an impact on IT.

- a. What will be the "Reporting frequency requirements" and what will be the impact of this?
- b. There are certain groups of contributors who currently are not part of the personified system. While these groups are not that significant in terms of the finances of the Pension Fund of Ukraine, their inclusion or exclusion in the personified system, has an impact on information processing.
- c. There are other social insurance funds: Unemployment, Work Place Accident, Health and Welfare Fund. Will these be combined with the Pension Fund of Ukraine reporting process?

B. Organizational Issues - Issues related to the structure and work responsibilities within the Pension Administration

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- a. Currently there is a quarterly reporting process, the 4PF, which requires the collection of information on a quarterly basis. It appears that the "personification" operation is a completely separate operational unit. How will these two operations be integrated.
 - b. The data flow process proposed appears to bypass the Oblast level.
 - c. Is the Pension Fund of Ukraine's IT department organized effectively to meet the coming challenges?

C. Administrative Issues - Issues involved in work and information flow.

- a. Is scanning of documents feasible and how will the Pension Fund of Ukraine organize the scanning operation?
- b. How should the Pension Fund of Ukraine perform archiving of the input forms?

D. Technical Issues - Issues related to computer and information technology directly

- a. There is a plan to set-up scanning centers for the personified data. There are many technical issues and questions associated with this:
 - a. Will the scanning process work well enough to make them worthwhile?

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- b. How many scanning centers will be required to handle the current and expected load?
 - c. Are the forms too complicated for the scanning process?
 - b. When will the Central Computer site be set-up?
 - c. There appears to be no software developed yet for the Central Computer site.
 - d. How will the data be transferred from the Rayons to the Oblast and then from the Oblast to the Central Computer site?
 - e. The Pension Fund of Ukraine does not appear to have an organized plan for maintenance of its computer equipment.
 - f. Is the Pension Fund of Ukraine aware that they will have to take over maintenance and enhancement of the ARM-R and the Atlas software at sometime in the future and are they prepared to do this? What is their ability to develop, modify and maintain software?
 - g. The back-up process at the Rayon offices is not adequate. The Pension Fund of Ukraine needs to pay more attention to this including setting up a standard backup procedure. Also, until such time as data is transferred to the Central Computer site they need to consider an off-site data storage protocol. Also,

just backing up the database to a workstation is not sufficient to insure that the Rayon office can recover from a major disaster or hidden data corruption. The Pension Fund of Ukraine needs to consider implementation of a generational backup method.

4. Policy Issues

To understand the impact of policy issues on the IT process it is important to understand the nature of the IT process for a pension fund. As with many technical issues, it will be easier to use an analogy, which may be more understandable to the layman. A useful analogy of the data collection and processing operation may be the farming process. We can compare the annual collection of personified data currently being performed by the Pension Fund of Ukraine as the harvesting process. This harvesting process, just as on a farm, is by far the most labor intensive and time-consuming work.

There are many factors, which can impact the time and therefore the cost of the harvest. Some of these factors are:

- The tools used to perform the harvest: The harvest can be done by hand or with the aid of harvesting machinery. In our analogy, this is comparable to using scanning equipment (harvesting machinery) or completing the process manually.

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- The frequency of the harvest: A harvest can be performed once a year, or in some areas with some crops a harvest can be performed twice a year. In our analogy, this relates to the frequency with which the Pension Fund of Ukraine will be required to collect personified data. If they were required to collect the data on a quarterly basis this would mean four harvests per year. If the data were to be collected on a monthly basis, this would mean twelve harvests a year.
 - The size of the field to be harvested: The bigger the plot of land to harvest the more time consuming. Likewise, the more people reporting personified data the more effort will be required to collect the data. In our analogy, this would relate to the requirement of collecting data on self-employed people, agricultural workers etc.
 - The density and difficulty of the crop to be harvested: Some fields may be planted with berries and may be extremely dense and therefore take a long time to harvest. Other fields may have very widely spaced crops, easy to cut and gather such as wheat. In our analogy, this relates to the complexity of the forms being used to gather the data and the amount and type of data being gathered. This relates to whether the Pension Fund of Ukraine will be required to collect data on other funds such as unemployment insurance, workplace accident insurance, health insurance, and social welfare insurance. In addition, the general design of the forms and the number of forms required per firm and per employee will have an impact on the process.

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- Storing the harvest and transporting it to processing plants: It can be a significant cost and effort to move the crops to storage containers and then transport them to central processing facilities. This is comparable to the storage of data on the local LAN and servers and then the transfer of files from the local Rayon office to the Oblast Center and then to the Central Computer site in Kiev. This will impact the number of computers and the size of hard drives.

What will be the "Reporting Period requirements" and what will be the impact of this?

By far the most significant factor in calculating the amount of effort and time involved in the collection process is the frequency of collection. Currently, the frequency of collection of the personified data is on a yearly basis. This is not to be confused with the period of reporting. The period for reporting personified data is monthly. A firm must report salaries paid to employees on a monthly basis.

The Pension Fund of Ukraine also collects employer information on the 4PF on a quarterly basis. This information is not broken down by individual, but is aggregated for the company as a whole.

Collecting the personified data on a yearly basis appears to be a manageable process with the current levels of staffing and computerization within the Pension Fund of Ukraine. For example, in the Lviv Oblast, one Rayon office has completed the data entry for 1999 in September of

2000 the other anticipates completion in November of 2000. This is, of course, a factor of the number of staff dedicated to data entry of the personified data in the rayon office. We were told that as of October 1st, 84% of the yearly data entry would be completed and by October 15th virtually 100% of the data would be entered into the system.

It is my estimate that under the yearly processing requirement of personified data it should be possible to collect the data with approximately 1000 staff. This includes an assumption of 30% of the personified forms being completed using the ARM-R. This number represents only the data entry staff. It does not include supervisory or ancillary staff in support of the data entry staff.

Moving to a quarterly collection frequency for personified, it is estimated the number of personnel required for personified data entry process would be approximately 1200 employees nationwide. Using a monthly frequency the estimated number of people required to perform data entry increases to 1500.

Frequency of Collection	Days to Complete	ARM-R %	# of forms completed in a day	Required Staff
Yearly	300	30%	100	1000
Quarterly	60	30%	100	1200

Monthly	20	30%	100	1500
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The number of staff required for data entry is not just a straight linear projection of the frequency rate. If it were we would expect the number of staff required for quarterly collection to increase to 3000 and the number for a monthly collection cycle to increase to 12000. Actually, because of efficiency in the form layout, we can assume that by redesigning the quarterly and monthly forms, we can get more employees on a page. Therefore, under the monthly collection regime we may collect as many as 20 employees on a page thereby reducing the total number of forms to be entered.

It appears that the Pension Fund of Ukraine has staffed adequately to perform the data collection on a yearly basis. They currently have hired 2500 new staff for the collection of personified data on a yearly basis.

Switching the frequency of collection to quarterly or monthly will put a significant burden on the Pension Fund of Ukraine, which it is not prepared to handle at the current time.

The draft law in Article 15 states, "layouts, procedures and deadlines for the submission of these details shall be specified by the Pension Fund of Ukraine". It is therefore up to the discretion of the Pension Fund of Ukraine exactly how it will collect the personified data.

It is the Pension Fund of Ukraine's belief that the changes to the legislation will require a monthly collection frequency. It is clear, that under the mandatory accumulation system, some type of monthly reporting will be necessary. Whether it will require employers to report wages on a monthly basis to the Pension Fund of Ukraine and whether that will be collected on a monthly basis is not determined. If the mandatory accumulation system is not implemented, the Pension Fund of Ukraine will continue to collect personified data on a yearly basis.

There are certain groups of contributors who currently are not part of the personified system. What will be the impact of including them in the scheme?

The Pension Fund of Ukraine has been collecting personified data on all categories of workers including agricultural and small enterprises. These groups had a special category under the old system and paid a flat tax, which was calculated based on certain factors such as, land area cultivated, etc. Under the current system these "flat tax" enterprises are required to report personified data like all other enterprises. It has been difficult to get these groups to report and it is estimated that many of these enterprises are currently not reporting. It does not appear that there will be a major unexpected influx of new contributors from this group.

There are other social insurance funds: Unemployment, Work Place Accident and Welfare Funds etc. Will these be combined with the Pension Fund of Ukraine reporting process and how will that affect the system?

There is a definite move within the government to combine the data collection of all social insurance funds into one collection and reporting process. Currently, there are plans for a pilot project in Lviv Oblast to transfer the responsibility for unemployment fund collection to the Pension Fund of Ukraine. According to the Pension Fund of Ukraine, other than this pilot project, there are no definitive plans for any additional activities of this type at this time.

Clearly, there are many advantages to combining these efforts into one collection process. The collection of monthly, personified data will facilitate the collection of all social insurance monies. At the same time, this will put some additional collection burden on the Pension Fund of Ukraine.

Collecting additional information such as unemployment insurance information should not be difficult. The amount to be transferred to the unemployment fund is a percentage of wages and can be easily calculated. It would become more difficult if employers were to pay different rates based on the type of industry or the type of employee. As long as it is a straight percentage of gross wages it is relatively easy to handle.

The effect of combining these operations would have a moderate impact on the IT process. It would require some modification to procedures and involve some additional activity in resolving

questions and problems on the forms, but will not drastically alter the collection and processing effort.

Type of Fund	Frequency	Current Status of Collection
Unemployment Fund	Monthly	Pilot testing Pension Fund Collection
Work Place Accident Fund	Quarterly	No plans for consolidation.
Health Fund		Does not exist now
Social Insurance Fund	Quarterly	No plans for consolidation

5. Organizational Issues

In this section, I will address issues related to the structure and work responsibilities within the Pension Fund of Ukraine and its IT operation. As the data processing requirements change and increase, the organization must change and grow to meet the increasing demands.

The Pension Fund of Ukraine will be facing significant growth in data processing over the next few years and their organization must adjust to meet these changes. Government agencies are not as flexible as private firms and it can take a long time for them to make necessary

adjustments. For this reason, it is important to identify future requirements as early as possible and prepare for them sooner rather than later.

In the area of IT it is often easier for a government agency to hire private contractors to meet the demands caused by rapid changes. Private firms are capable of providing services quickly and adjusting to changing environments quickly. The rapid development in IT often requires an organization to acquire new skills quickly. Private firms are able to locate and hire specific expertise that may be difficult for a government agency to obtain. For these reasons, it is a viable strategy to contract services under certain conditions.

The following are some examples of appropriate services and tasks to be contracted out by an IT department.

- Discrete software development tasks
- Development of user manuals
- Installation of network servers
- Highly technical communications tasks, such as installing and configuring routers, installation of satellite dishes, laying fiber-optic cable etc.
- Training of technical staff

When contracting for IT service the following principles should be followed:

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- Never contract out the fundamental core activities of the organization
 - Always retain complete ownership over all products developed for the organization.
 - Always competitively bid the contract with at least three companies submitting tenders.
 - Establish an unbiased method for evaluating tenders.
 - Include qualitative considerations, such as quality of service, as important factors in the evaluation process. Do not base selection decisions solely on cost.
 - Always maintain control over what tasks the contractor will be performing.
 - Always maintain control over the schedule of deliverables.
 - Impose consequences for late deliverables.
 - Have a strategy for changing contractors or canceling a contract.
 - Never become completely dependent on any contractor.

The Pension Fund of Ukraine must be creative in meeting the challenges of the increased IT requirements over the next few years. It must be able to adjust its organization to meet the changing situations.

Pension Fund of Ukraine relies heavily on both Atlas Computer Firm and PADCO for software development and computer consulting. Should this dependence be reduced?

The Pension Fund of Ukraine relies very heavily on two contractors for much of their computer support. While this is not inherently bad, being dependent on contractors puts the Pension Fund of Ukraine in a precarious position. I have the following concerns:

- **Atlas Computer Firm:** I recommend that the Pension Fund of Ukraine maintain tighter control on the relationship with Atlas. Atlas must have defined deliverables with definite dates for task completion. The Pension Fund of Ukraine must have skilled personnel, who are knowledgeable about the work of Atlas, overseeing the activities of Atlas.

It is important that all licenses and copyrights for software be clearly delineated. The Pension Fund of Ukraine must retain ownership to all source code developed for them by any contractor.

It is essential that basic information on all government contracts be open to public inspection. Specifically, the size of the contract and scope of the contract should not be confidential information. When all contracts are competitively bid, the specifics of any contract should be accessible through the RFP process.

- **PADCO:** PADCO is a USAID contractor and its work for the Pension Fund of Ukraine is performed under the auspices of USAID. USAID funding is designed as

short-term technical assistance and should not be considered as a permanent solution.

In particular, the ARM-R was developed and is being maintained by PADCO. It is time for the Pension Fund of Ukraine to take serious steps to prepare for transfer of all ARM-R functions. I would propose that the ARM-R programming maintenance be turned over to the Pension Fund of Ukraine at the end of the current contract cycle on January 1, 2000.

It is clear that Pension Fund of Ukraine staff will need to be trained in the design, development and modification of the current software. This should be hands-on training with the current developers of the software. While it will be difficult to have total facility with the software programs, the Pension fund of Ukraine should strive to reduce its dependence on outside contractors and to begin to develop a meaningful in-house capability.

In addition, the Pension Fund of Ukraine staff should be trained in all the software tools that are used by Atlas and PADCO. This would include FoxPro, Informix, Delphi and the CASE tools used by Atlas. In addition, the Central Computer site staff should be trained extensively on the HP server environment including the Unix Operating System.

The Pension Fund of Ukraine must establish an effective IT department capable of handling the many additional IT requirements faced by the Pension Fund of Ukraine in the next few years.

Currently, the IT department at the Pension Fund of Ukraine is divided into two organizational units. The two units are the personification unit (personified data responsibility) and the computerization unit (4PF responsibility). The current staff size for these two units is 12 and 10 staff respectively. As mentioned earlier these two functions should be integrated more closely. I feel it would be an opportune time to re-organize the IT Department along technical/functional lines.

Organizing along functional lines means that units performing similar tasks are grouped together. For example, a software development unit would be responsible for developing software for any unit within the organization. There are advantages to organizing in this manner. There can be significant internal training and staff development when people of like skills are grouped together.

There are a number of areas where the Pension Fund of Ukraine needs to have capable staff to either perform technical work or closely supervise contractors. Some of the areas where additional staff will be required are:

- Central Computer site - It is essential that the central site be operated primarily by Pension Fund of Ukraine staff. While there will be a need for some outside contractors

to assist in some highly technical tasks, the day to day operation of the unit should not be contracted out. The Pension Fund of Ukraine is planning to hire 30 staff for the Central Computer site and this should be adequate for this facility.

- Telecommunications Operations - As the Pension Fund of Ukraine's Information System develops there will be a need for greater expertise in telecommunications. There will be a host of telecommunication questions facing the Pension Fund of Ukraine over the next few years. These will include the establishment of an Intranetwork between the Rayons, Oblasts and the Central site. An intranet is an internal network, which does not link to the outside world.
- Internet Operations - As the Internet becomes more significant in the Ukraine, there will be a need for a unit of HTML/Website developers and Internet communications. As more and more information is displayed on the Internet, the Pension Fund of Ukraine will need expertise in publishing information on the Internet. Eventually the Pension Fund of Ukraine's network will be integrated into the Internet. At some future point, it will become advantageous to use the Internet as the basis for the Pension Fund of Ukraine's network.
- Software Development - The Pension Fund of Ukraine will need trained software staff to develop as well as maintain various software programs. Specifically, they will need programmers to assume responsibility for the ARM-R software. They will also need software staff to maintain the national level database. Further, they will need staff to

assist analysts and planners with analysis of the national level database. This unit will perform ad hoc queries and generate tables from the central database. Finally, there needs to be trained staff capable of overseeing the tasks that Atlas is currently performing for the Pension Fund of Ukraine.

I propose an organizational restructuring of the IT Department. At this time, I could not determine the actual functional units and their size and make up without further analysis.

Currently there is an employer reporting process, the 4PF, which requires the collection of information on a quarterly basis. It appears that the "personification" operation is a completely separate operational unit. How will these two operations be integrated?

As mentioned previously, the Pension Fund of Ukraine has hired 2500 staff to handle the increased workload of the personification effort. They established a separate organizational unit within each Rayon and Oblast office.

These new "personification" departments do similar work to the traditional unit responsible for the 4PF data collection. It appears that there could be significant savings by combining these two separate units.

On a local level, there has been cooperation between these units and this appears to be increasing. There could be significant savings by further integration of these units.

Another area, which should be explored, is combining the 4PF with ARM-R submission process. Clearly, the combining of these two collection efforts would reduce the employers reporting burden as well as lighten the data collection workload. I recommend this be implemented as soon as possible

The data transfer process between Rayon - Oblast - Central needs to be developed in a uniform fashion and the Oblast must be considered an important link in this data communication.

The current data transfer method from Rayon to Oblast is a suitable method, in theory, for transferring data. Taking the data from the Rayon to the Oblast by physical transport of the data is a viable short-term solution. It is not feasible to transfer the large quantities of data by modem over standard phone lines.

Currently, the method used for transferring the data from Rayon to Oblast is to remove the disk drive from a workstation with a copy of the data files on it, and physically take it to the oblast and read the files onto a computer there. This is not a reliable solution. It is too risky to the hard drive to move it around in this way.

I would propose the installation of a Read/Write CD ROM in each Rayon and Oblast center. This would provide the maximum amount of transfer capacity at the minimum cost. Moving CD's is a lot easier then moving hard drives.

At this time there is no Central Computer site. It is anticipated that the link between the Oblast center and the Central Computer site will use some form of hi-speed leased lines. Clearly, it would be too expensive at the current time to provide leased lines to all Rayons. The Pension Fund of Ukraine should consider a scenario in which all data transfer will go from Rayon to the Oblast and then from the Oblast to the Central Computer site.

The Pension Fund of Ukraine has been in contact with other governmental organizations such as the Tax Administration and Treasury discussing ways to share in a communications network among Oblasts. I feel it is very prudent of the Pension Fund of Ukraine to investigate this option with other organizations interested in moving data over computer networks. I would urge them to consider implementing a pilot test as soon as possible. I have no further information on the existing networks at the Oblast level, but it would be valuable to research this issue in greater detail.

6. Administrative Issues

Administrative issues are related to the methods and techniques for processing information.

Administrative issues may overlap with organizational and technical issues.

How will the Pension Fund of Ukraine collect the large quantity of data over the next several years? What methods will be used to accomplish this task:

There are several possible methods for collecting the large amount of "personified" data. These methods are described below:

- Manual entry into the computer - This is the current method of processing the bulk of the "personified" forms. The Pension Fund of Ukraine has purchased approximately 6,000 computers for this purpose. Most of these have been installed in Rayon's and are being used to enter personified data.
- ARM-R submission - Companies may submit their data via floppy disk using the ARM-R program. When the data is submitted using this method, the workload for the Pension Fund for data collection is drastically reduced.
- Scanning Technology - PADCO and the Pension Fund of Ukraine have been experimenting with the use of optical scanners for the data entry process. Employers will submit their personified data form on machine-readable forms and then the Pension Fund of Ukraine will scan the documents in to the computer.
- Internet Submission - Another possible method, which should be considered, is the entry of data on a data form via the Internet.

Now we will examine each of the above option in more detail:

Manual Entry

Of course, this was a necessary first step in the process. The manual entry system currently can be done via the ARM-R program or through the Atlas program. In either case it requires an operator to manually type at the keyboard all information. It is estimated that the average operator can enter approximately 100 forms in an eight-hour day.

Using the above numbers we can estimate that approximately 1000 data entry operators are needed to process the data (see earlier table). If we assume that the process will change to a monthly collection frequency then this number would increase to 1500 personnel. This will depend on the design of the monthly collection form.

ARM-R Submission

The ARM-R greatly reduces the data entry work of the Pension Fund of Ukraine by transferring the responsibility of providing data in magnetic form from the Pension Fund of Ukraine to the enterprises filling out the form. Thus everyone benefits. Unfortunately, only about 30% of enterprises used ARM-R in 1999. Hopefully, this number will increase as more enterprises use personal computers and learn the benefits of using ARM-R.

The ARM-R submission has been primarily from the large employers. These large enterprises have access to computers and can gain significantly from submitting the data in electronic format. The smaller employers are much less likely to have computers and to submit their forms via computer.

Given the obvious benefits to the Pension Fund of Ukraine, I would propose that the Pension Fund of Ukraine develop some incentive program for firms to use the ARM-R for their submission. In addition, the Pension Fund of Ukraine should find some additional methods of encouraging smaller enterprises to submit via the ARM-R.

Scanning Technology

PADCO has undertaken a large effort in examining the possibility of using optical scanners to process the personified data submission. At the current time, there is a proto-type system in operation at PADCO. The system has been tested with a variety of handwriting styles and appears to be very effective in recognizing different handwriting.

However, there is a difference between a controlled environment and the real world. We have proof that it can work in the test tube, but no proof that it will work in the real world.

It is essential that a pilot test be setup as soon as possible to test the true feasibility of the scanning process before any detailed plans are undertaken. There are a number of issues that need to be examined under real life conditions:

- How many errors will be experienced on live forms.
- How difficult and time-consuming will it be to correct forms with errors.
- How durable will the equipment be under real conditions?

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- How difficult will it be to train the equipment operators?
 - What will the actual throughput be (forms per day)?

I feel that the technology as developed by Mr. Mutchnik and his staff is the most feasible scanning methodology. He and his staff have developed a practical method for scanning the complex array of documents.

Optical scanning would be an attractive method for entering data into the personified system. It is also clear that the Pension Fund of Ukraine has relied heavily on the work performed by PADCO in this area. I believe this is a good use of USAID resources in its goal of assisting the Pension Fund of Ukraine in reforming and improving its operations. I strongly urge USAID and PADCO to continue to proceed with the implementation of a scanning pilot project.

At this time it is premature to determine how many scanning centers should be established and what the size and capacity of these centers should be. There is some differences of opinion about the number and location of these centers. It is clear that there are economies of scale, which would favor the establishment of a few large centers. However, there are arguments to be made for setting up smaller centers, which would eliminate the expense of transporting documents (and people) long distances.

I feel it is necessary to examine the experience in the pilot sites before making any final decision. Once the data from the pilot sites have been studied closely, it will be easier to make a final determination about the number of centers necessary.

Internet Submission

Clearly, in the long run, the Internet will be the optimal method for collecting information from employers. The use of data entry forms via the Internet is a proven technology. I feel it is not premature to begin experimenting with methods of developing data entry forms via the Internet.

There are many who say that the Internet will not be a viable method in the Ukraine for many years into the future. I believe the Internet will develop more rapidly than anticipated in the Ukraine. In any event, the Internet is available for some employers in the Ukraine, today.

Additionally, it is a good idea to begin developing the skills and knowledge necessary to utilize the Internet when it does become a truly viable option in the Ukraine.

In my mind, this would be a logical next step for the PADCO software development team to explore. I believe they should proceed with development of a prototype submission form.

How will the Pension Fund of Ukraine archive the large quantity of data over the next several years. What methods will be used to accomplish this task:

Archiving the massive quantity of paper forms will be a major task for the Pension Fund of Ukraine in the future. The current legislation mandates forms to be retained for 75 years. It is not unreasonable to require this since a person may have a question about his or her pension benefit that may involve searching thirty or forty year old documents.

Currently, the hard copy documents are being stored in Rayon offices. It is estimated that the Pension Fund of Ukraine will need approximately 30,000 sq. meters of storage space per year. In addition, they will need 5 kilometers a year of shelving space. If we multiply this by the number of years of storage (75) we see that this is a major issue for the Pension Fund of Ukraine.

There are several technologies for storing paper documents on computer readable media. Transferring to CD or optical disk is probably the most cost effective method available to the Pension Fund of Ukraine. This would be particularly attractive since the scanning process includes the digitizing the image. Therefore, the scanning process could perform the data input and data archiving operation in one step. Again, this would be a logical area for the PADCO team to explore.

When documents are scanned the system captures the image of the document. The image files are in TIF format. We estimate using the current scanning technology a full year of data for about 20 to 30 employees would use about one megabyte of storage.

# of Employed	# of Employed per Mbyte	# of Employees per CD	Total # of CD's required at 650 MB
20000000	20	13000	1538

As can be seen, an entire year of data could be stored on 1538 CD's. Clearly this is an attractive method of archiving that should be explored. The archiving system will have to take into consideration that companies submitting their forms on ARM-R will not go through the scanning process.

There is also a policy concern related to the archiving of data. Currently, there is no agreement on whether a digitized copy of the original form is legally valid and may be used in place of the original paper form. In addition, will an ARM-R submission be adequate for archiving or will an image of the data be required. The law must address these issues before any final decision on archiving can occur.

7. Technical Issues

Technical issues are related to complex information technologies that require in-depth analysis to implement. I have identified the several issues, which are of a sufficiently detailed nature that their development and implementation are worth analyzing in technical detail.

When will the Central Computer site be set-up?

During this visit I was able to view the facility, which will become the Central Computer site. I was also able to see the HP computers that will be the servers for the central site. The servers have not been installed nor have any workstations been set-up. However, I was satisfied that

the Central site is under development and will be functioning before the end of the year, if all goes well.

The Pension Fund of Ukraine staff should be involved in all aspects of installation of this facility.

I would recommend that Pension Fund of Ukraine technical staff be present at all times while the HP engineers are installing and setting up the system

What is the status of Atlas software?

I have observed that the Atlas software is up and running in the Rayons in Lviv and Kiev. It appears to work adequately at this level.

From my discussions with Atlas, I have gleaned that the software operates using the Informix Database engine running in a Unix environment. The actual screens for the Atlas software have been written using the Delphi language.

It is necessary that the Pension Fund of Ukraine develop the in-house skills to maintain this software. Therefore, their staff should be trained in Delphi and Informix.

What backup procedures are in place and are they adequate?

From my visits to Rayon and Oblast sites it is apparent that there are no strict backup procedures in place. In all cases, the critical personified data was being backed up to another

workstation's hard drive. In addition, at the Rayon, the data was being sent to the Oblast for storage.

I feel that in the particular case of Lviv, this was probably adequate to insure that total loss of data would not occur. What concerns me is the lack of any standard procedures for backing up the data. I am not sure that all 735 Rayons are performing an adequate backup.

In addition, although the critical data was being backed up at the personification office in the Rayon's, there was no attempt to backup the entire server. How serious is this? In most commercial operations a full tape backup on a regular basis is standard operating procedure. Just backing up to a workstation would not be considered adequate backup. There are a few reasons why under commercial operation a full "generational" backup is required.

- A costly aspect of restoring a server from a crash is the loss of "configuration" information. This is the actual configuration settings on the server, which have been adjusted over time. In a relatively simple network the configurations can be reinstalled easily. In a complex network this can be a major problem that can take weeks or months to straighten out.
- Keeping generational copies of the database can be the only way to correct certain problems that can develop over time in a data file. For example, a software bug or virus may create a problem in which data is being destroyed. This problem may only be occurring randomly or sporadically and may not come to light for several days. If the

tape back up cycle is too rapid, that is the tapes are rotated too quickly, and if the problem is not caught soon enough, the system may have no "good" copy of the database. Backing data up to a workstation is by definition a "non-generational" backup. There is only one backup copy of the data file available.

I believe that a definitive policy by the Pension Fund of Ukraine for backup should be established. Further all Rayons should be trained on the procedures and should be required to follow the procedures.

Of course, it would be prudent to have a full "generational" tape backup process in place. This would require the installation of a tape drive and software in all servers. The cost of this would be around \$ 500 to \$ 1000 per server.

The Pension Fund of Ukraine does not appear to have an organized plan for maintenance of the computer equipment.

Again, from my visits to Lviv Oblast and discussions with the Pension Fund of Ukraine, I was not satisfied with procedures for obtaining computer maintenance support. It appeared that there is no standard procedure in place for computer maintenance support. I did not have sufficient time to make a cogent recommendation in this area.

7. Conclusion

In general, I feel that the Ukrainian Pension Fund of Ukraine has taken the necessary first steps to develop its IT capability to handle the increased workload that will be required by any Pension Reform effort. The following are indicative of their commitment to improving their IT capacity:

- Hired an additional 2500 employees for the personification effort.
- Purchased up to 10,000 computers of which 6,000 will be used for the personification process.
- Gave full support to the development of ARM-R.
- Contracted with Atlas to create nationwide personification software.
- Purchased equipment and established a location for the Central Compute site.

I am encouraged by the Pension Fund of Ukraine's initiative in meeting the challenges of personification. They have accomplished the initial task of collecting personified data on a yearly basis.

However, at this point in time there are still many challenges ahead and the Pension Fund of Ukraine must continue to work diligently to meet these challenges. It is my estimation that the Pension Fund of Ukraine is at least one and a half years away from creating a functioning

centralized national database. In addition, it will be at least three to four years before they will be capable of implementing a monthly mandatory accumulation system.

The following are a summary of my recommendations for improvements to the Pension Fund of Ukraine's IT capacity.

Recommendation/Observation	Level
Combine 4PF Reporting form with Personification.	Desirable
Reorganize the IT department to reflect functional activities. Combine personification and 4PF staff	Important
Reduce dependence on contractors	Important
Take over maintenance and development of ARM-R	Important
Retain ownership of all source code and systems developed by Atlas and PADCO	Critical
Set-up and staff the Central Computer site	Important
Develop a pilot scanning project	Critical

Begin to design an archiving methodology	Desirable
Develop training program for the IT staff in both hardware and software	Important
Develop a plan for data transfer between Oblasts and the Central Computer site	Important
Implement a more reliable method of transferring data from Rayon's to Oblasts.	Important
Establish strict procedures for backing up server data at the Rayon and Oblasts.	Important
Develop a plan for maintenance of all Pension Fund computers, networks and software nationwide	Desirable
Begin developing an Internet based reporting form	Optional

USAID's efforts in the IT area over the past few years have produced substantial results. The development of the ARM-R is an example of how USAID's efforts have been extremely beneficial. In a similar way, the work that is being done in support of scanning by USAID will also be of major importance to the pension reform effort.

It is important for USAID to play a continuing active role in supporting efforts to improve the IT capabilities of the Pension Fund of Ukraine. Any effort to implement Pension Reform in the Ukraine will involve the intensive use of information technology. It is impossible to collect and process the quantities of data in a national Pension Fund of Ukraine without extensive use of technology.

The next step in the process should be agreement by all parties on the recommendations put forth here. Once there is general agreement on these recommendations then a timeline for accomplishing the proposals should be developed.

Report to USAID ONLY

THE ROLE OF USAID IN ASSISTING THE IT COMPONENT OF UKRAINIAN PENSION REFORM

It is important to understand that all policy changes come with an implementation price tag.

The Ukrainian pension reform is no exception. It comes with a large price tag particularly in the area of information technology.

The primary role of the information technology component of the Pension TA should be to assist the government in understanding the IT requirements and making the operational changes that will be necessitated by the implementation of any new pension law.

The fundamental change brought on by this reform will be a basic shift in the focus of the data collection and processing. Currently, the data collection and processing effort is focused at the employer level. This is the most efficient method given the requirements of the current scheme because it does not require accurate compilation and tracking of contributions at the individual level.

Under the any new system the focus will shift to the individual. There will be much more reliance on the computerized records. It would be virtually impossible to manually piece together and calculate a person's individual account information over a period of time.

Therefore, the new system, demands more careful treatment of the computerized data.

In the area of IT, costs can never be confined to one component part. For example, upgrading software will often require upgrading of hardware. Upgrading hardware can necessitate upgrading wiring and network equipment.

There is a natural tendency from a funding agency to ask, "How does this activity relate to my project directly". It is a judgment call as to the need and appropriateness of any given expenditure. It remains to be seen if the IT capacity, as it stands, will be sufficient to enable the government to smoothly and accurately introduce a new pension system.

So what should be the role of USAID in this environment? It is not the role of USAID and its contractors to be on-going player in the IT area. The Pension Fund of Ukraine must not rely on USAID for long-term support.

The role of USAID and its contractors should be similar to a scout. They should be scanning the horizon watching for problems and exploring solutions for those problems. Helping to decide which path is the most appropriate and exploring this path in advance of the Pension Fund of Ukraine.

In light of this, there are a number of specific technical areas where USAID and PADCO can put their effort. These are:

Areas where USAID should be placing their efforts
Develop a pilot scanning project and assist in developing and modifying the forms
Begin to design an archiving methodology
Develop training programs for the IT staff in both hardware and software
Begin developing an Internet based reporting form

In addition to these specific areas where technical effort can be placed, there is an additional role for the USAID IT expert. The IT expert should be an advisor to the IT department of the Pension Fund of Ukraine. In this role, the IT expert should be listening to the Pension Funds problems and giving them feedback and recommendations.

This role requires that the Pension Fund of Ukraine trust the IT expert and value his/her input. This kind of relationship can only develop over time and is based on mutual trust. The IT expert must prove that his motives are sincere, that his input is valuable and that he/she is a team player.

To gain the trust and respect of the Pension Fund of Ukraine, the IT expert must be a good listener. It is important to be un-biased in analysis and to respect and value the opinions of the Pension Fund staff.

Finally, USAID must support this IT expert by giving careful consideration to his/her ideas and evaluations. The IT expert will need the confidence of USAID to be effective in his/her role.

At this point, I see no reason why the IT expert cannot be successful in establishing a positive relationship with the Pension Fund of Ukraine. There are some people in the Pension Fund staff who are distrustful of outsiders and this will present some problems. But I feel that cooperation will be possible to achieve.